

Review Paper on Improve Quality in Sand Casting Industry using Total Quality Management (TQM) Tool

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Abstract— In India there are many foundry have followed conventional and manual operations. Today's competitive environment has, more productivity in less time, lower manufacturing cost and improve quality product, defect free operation are required to follow to every foundry staff. Mold shifting, Crushing, Lower Surface finish, Shrinkage, Porosity, Cold shut and Extra material are common casting defects due to these manual processes. These defects are directly affected on product, profit and quality level of organization. The paper presents analysis of these defects with Pareto and Cause and Effect diagrams to know correct cause and correct remedial factors to improve quality level and productivity of organization. In the present global and competitive environment foundry industries needs to perform efficiently with minimum number of rejections. Also they have to develop casting mechanism in very short lead time. Casting process is still state of art with experienced people but these experience needs to be transformed in engineering knowledge for the better growth of the foundry industries and quality. Some foundries are working with trial method and get their work done. Actually, most of the foundries have very less control on rejections. Majority foundries are failed to maintain a satisfactory quality control level. Defect free castings with minimum production cost have become the need of the foundries. The move toward taken by this paper is expected to motivate the foundries to use a standard classification system to describe undesirable casting artifacts for more useful failure analysis. It will also give confidence foundries to develop systems to measure process parameter relating to the defects that happened in the foundries and pool the resources of area experts. Any reduce in the waste and rework also positively influences the environmental impact of our industry. In this paper its deals the various aspects of an organized approach to understanding and development of quality cost system in cast iron foundries. This study is improved the quality and productivity of entire process of casting manufacturing.

Key words: Sand Casting, Total Quality Management (TQM) Tool, Casting manufacturing

I. INTRODUCTION

Now days total Quality Management (TQM) is very helpful to all production units. Quality is defined as the fitness for use or purpose at the most economical level. It is an integral part of the process of design, assembly and manufacture. It can be certain by having effective procedures and Controls at various stages. Manufacturing industries like foundries do not enjoy monopoly but they have to face competition. To overcome this problem and to retain the share of the market, it is necessary to improve the quality of the cast product without the increase in the price of the products. The price is affected by the cost of production, which in turn is affected by rework or rejection. Consideration to quality can reduce

the wasteful rework. Aim for quality in the first instance can reduce the cost of casting production. By that quality results in the company growth and productivity will increase. Quality in a product is hard to define and invariably involves a consideration of the service environment. The most meaningful definition involves the concept of strength for a given purpose or application at a set life of number of hours, months or years in service. For a given place of service conditions, quality and reliability are unified to a certain extent. The minimum quality suitable in any application is that level of quality necessary to ensure that the arranged section of the components will pass through the predicted service life without failure. The basic concepts of quality are that the finished cast products must meet conventional specifications and standards and hence customer's satisfaction.

II. LITERATURE REVIEW

Sunil Chaudhari, Hemant Thakkar[1] this paper include Some foundries are working with trial and error method and get their work done. Factually, most of the foundries have very less control on rejections, as they are always on the toes of production urgency; hence they ignore the rejections and salvage the castings. Majority foundries are failed to maintain a satisfactory quality control level.

Marcello Colledani, Tullio Tolio, Anath Fischer Benoit Jung , Gisela Lanza, Robert Schmitt, Jo zsef Vancz [2] this paper include companies are continuously facing the challenge of operating their manufacturing processes and systems in order to deliver the required production rates of high quality products, while minimizing the use of resources. Production quality is proposed in this paper as a new paradigm aiming at going beyond traditional six-sigma approaches. This new paradigm is extremely relevant in technology intensive and emerging strategic manufacturing sectors, such as aeronautics, automotive, energy, medical technology, micro-manufacturing, electronics and mechatronics.

T. R. Vijayaram, S. Sulaiman, A. M. S. Hamouda, M.H.M. Ahmad [3] In this review paper, some of the solutions and quality control aspects are explained in a simplified manner to eliminate the unawareness of the foundry industrial personnel who work in the casting manufacturing quality control departments. This review paper provides very valuable information to the young manufacturing and mechanical engineers who have interest to start their career in the manufacturing concerns of medium and large scale captive foundries.

ANIRUDDHA JOSHI, L.M.JUGULKAR [4] This paper presents all data of manual metal casting operations and defects leads to rejection for this organization. The paper also represents analysis of these defects with Pareto and Cause and Effect diagrams to know correct cause and correct remedial factors to improve quality level and

productivity of organization. Today's competitive environment has, lower manufacturing cost, more productivity in less time, high quality product, defect free operation are required to follow to every foundry man.

Monica Izverciana, Alina Radua, Larisa Ivascua, Ben-Oni Ardeleanb [5] this paper presents the view of the authors with respect to the relationship that exists between total quality management, human resources management, competitiveness and ISO 9000 and the impact of this relationship on the sustainability of the enterprise. The proposed conceptual models will help the persons of interest to have a better understanding of the relationship between the practices and step by step implementation to improve business performance.

Raghendra Banchhor, S.K. Ganguly [6] This paper extensively reviews published research on green sand casting process. The effects of riser design, gating system, moulding sand, oxidation and deformation of casting during heat treatment, machining allowance, etc., on the economical manufacture quality castings were reviewed. Determining the optimal process parameter setting will significantly improve the mould yield, output ratio of metal, shorten manufacturing period, save energy and resource, reduce pollution, and improve the competitiveness of enterprises.

Raguramsingh.M, Syath Abuthakeer.S [7] A case study is carried out for a foundry, where Six Sigma methodology is implemented for the defect reduction. The optimized parameters are considered to perform the practical run for the automobile castings. Proposed technique is about optimizing the control factors, resulting in superior quality and stability. This study aims to implement a novel approach to improve the quality (reducing the defects) of a foundry by Six Sigma methodology on the selected projects.

Nicolas PERRY, Magali MAUCHAND, Alain BERNARD [8] in this paper, In the early phases of the product life cycle, the costs controls became a major decision tool in the competitiveness of the companies due to the world competition. After defining the problems related to this control difficulties, we will present an approach using a concept of cost entity related to the design and realization activities of the product. We will try to apply this approach to the fields of the sand casting foundry. This work will highlight the enterprise modeling difficulties and some specific limitations of the tool used for this development. Finally we will discuss on the limits of a generic approach.

Dr.M.Arasu [9] the approach taken by this paper I expected to motivate the foundries to use a standard classification system to describe undesirable casting artifacts for more effective failure analysis. It will also encourage foundries to develop systems to measure process parameters relating to the defects that occur in the foundries and pool the resources of domain experts. Any reduction in the scrap and rework also positively influences the environmental impact of our industry. In this paper, it deals the various aspects of a systematic approach to understanding and development of quality cost system in cast iron foundries.

Lakshmanan singaram [10] outcome of the paper is the optimized process parameters of the green sand casting process which leads to improved process performance, reduced process variability and thus minimum casting defects, also a neural network modal is improved process

performance, reduced process variability and thus minimum casting defects

Zanele Mpanza and Didier Nyembwe [11] In this paper interviews with production managers and support services managers were conducted, and historic data in company reports was used. The production constraints were then identified and a series of projects to assist improve operations were conducted. These projects include calculation of plant capacity, labour efficiency, standard times, and lead time. This paper discusses three of the conducted projects: labour efficiency, plant capacity and lead time.

III. CONCLUSION

From review of above literature we can conclude the following points:

- Total Quality management is not only beneficial to large and medium scale industries but also beneficial to small scale enterprise.
- The company must develop standard operating procedures for all processes involved in production line by improving the existing policy in order to make production process more efficient.
- It is concluded that careful supervision with effect motivation of individual employees in achieving the quality is a must in reducing the rejection and scrap in metal casting manufacturing engineering industries.
- New production quality paradigm for modern, zero-defect oriented, manufacturing industries.

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